

B R E V I O R A

Museum of Comparative Zoology

CAMBRIDGE, MASS.

MAY 1, 1957

NUMBER 74

THE DISCOVERY OF CERAPACHYINE ANTS ON NEW CALEDONIA, WITH THE DESCRIPTION OF NEW SPECIES OF *PHYRACACES* AND *SPHINCTOMYRMEX*

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During December, 1954, and January, 1955, the author was fortunate in being able to spend an uninterrupted five-week period on New Caledonia, studying the ant fauna of the island.¹ During this time three species of *Phyracaces* and *Sphinctomyrmex* were collected, all undescribed and representing the first cerapachyine ants ever found on New Caledonia. Their presence is of some zoogeographic importance, in that they appear to ally the ant fauna of New Caledonia more closely with that of eastern Australia, as opposed to the remainder of Melanesia. *Phyracaces* and *Sphinctomyrmex* are strongly developed both in species and in individual numbers in Australia, but are known from only three rather rare species (two *Phyracaces* and one *Sphinctomyrmex*) on New Guinea, and are unknown from the rest of northern and central Melanesia. In an obverse relationship, *Cerapachys* (*s. str.*), is the predominant cerapachyine genus on New Guinea and the Fijis, but has never been collected in either Australia or New Caledonia. Finally, the New Caledonian *Phyracaces* and *Sphinctomyrmex* are most closely allied to eastern Australian species, as indicated in the descriptions to follow.

PHYRACACES COHICI Wilson, new species

Diagnosis. A shining, black, medium-sized species closely related to the *turneri* group of species of eastern Australia. *P.*

¹ Field research was supported by grants from the Society of Fellows, Harvard University, and the Museum of Comparative Zoology.

cohici can be easily distinguished from the latter group, which includes *turneri* Forel, *adamus* Forel, and *larvatus* Wheeler, by its more obtuse and rounded dorsal propodeal corners. In *cohici* these corners form an angle of more than 110° when viewed from the side, while in the *turneri* group of species they form an angle of 90° or less. *P. cohici* also bears a fair resemblance to the Australian *P. senescens* Wheeler, but can be separated from this species by its longer, flatter petiolar node and straighter and more horizontally aligned posterior petiolar teeth.

Holotype worker. Head width ¹ 0.99 mm, head length 1.05 mm, scape length 0.63 mm, cephalic index 94, scape index 64, exposed length of mandibles 0.21 mm, eye length 0.26 mm, pronotal width 0.79 mm, petiole width 0.83 mm, petiole length (measured from the midpoint of the anterior border of the node to the midpoint of the posterior border of the posterior peduncle) 0.63 mm, postpetiole width 0.83 mm, postpetiole length 0.67 mm, width of next gastric segment 1.00 mm. Occipital border very feebly convex in full-face view. Alitrunk viewed from above moderately constricted medially, marginate along the entire dorsolateral border except for an interval of about 0.20 mm in the region of the mesothorax. Petiolar node viewed from directly above with strongly concave anterior border, and evenly convex lateral borders, its widest point being about in the middle (see accompanying figure). In the same view the posterolateral teeth extend well beyond the posteriormost point of the posterior node border. Seen from directly above, the postpetiole is widest in the anterior half and is laterally marginate only in the anterior half.

Entire body covered by scattered piligerous punctures spaced on an average of 0.03 to 0.06 mm apart, the interspaces completely smooth and shining. On the sides of the alitrunk the punctures are unusually small, being barely visible at 40X magnification.

¹ Head width and other body measurements were made in the standard fashion employed by W. L. Brown in his published serial studies of the dacetine ants and by myself in my recent revision of the ant genus *Lasius* (1955, Bull. Mus. Comp. Zool. Harv., 113: 1-200). In the past, Brown and I have differed slightly in our definitions of head length, but in the present paper I have decided for the purposes of uniformity to follow Brown's original definition, which was given as follows: "critical maximum length of the head, measuring from a transverse through the posteriormost point or points along the occipital border to a transverse through the anteriormost point or points on the anterior clypeal border" (1953, Amer. Midl. Nat., 50: 11). With this change I believe that our *standardized* measurements now all agree in every detail.

Entire body deep blackish brown to jet black, except for the mandibles and gastric apex, which are dark reddish brown. Appendages variably dark reddish brown.

Worker variation. Maximum head width of type series (all shown by a single colony, acc. no. 190): 0.88-1.01 mm. The worker type series shows very little variation in other external characters.

Male. Head width (across and including compound eyes) 1.10-1.14 mm. Antenna 13-segmented. Mandible well developed, narrowly subtriangular, its masticatory border bearing a large, blunt apical tooth followed basally by an indeterminate number of serial denticulae; the masticatory and basal borders joining through an even, convex curve. Clypeus narrow, its dorsal surface gently convex, its anterior border seen from directly above moderately and evenly convex.

Parapsidal furrows well developed, parallel with each other, and extending anteriorly for about half the length of the scutum. Notaulices absent. Median notal suture present and extending posteriorly for slightly more than one-third the length of the scutum. Wing venation generalized, essentially similar to that of *Cerapachys* (see Brown and Nutting, 1950, Trans. Amer. Ent. Soc., 75: 132, pl. VIII), differing primarily as follows: *Rsf*2+3 is lacking, and the second radial crossvein and *Rsf*5 form a single unit coming off the stigma. The crossvein "x" indicated by Brown and Nutting in the basal cubital-anal region of *Cerapachys manni* is missing in *Phyracaces cohici*.

Petiole completely lacking the lateral margination that characterizes the *Phyracaces* worker caste. Seen from above, the node is widest in its anterior half, and its anterior and posterior corners are gently rounded; seen from the side, the node forms a single, even, strong convexity only weakly demarcated from the peduncles. Genitalia completely retractile. Subgenital plate relatively large (exposed length about 0.35 mm), sclerotized, tapering posteriorly to end in a pair of sharp, upward curving hooks each about 0.06 mm in straight length. Parameres short, broadly rounded apically.

Pilosity, sculpturing, and color essentially as in the worker.

Types. Described from a long series of workers and four males collected by the author at Ciu, near Canala, at 300 meters, and from two kilometers southwest of Ciu, at 500 meters, New Cale-

donia. The following accessions are included: 190, 246, 263 (holotype nest series), 267, 275, 278, 298. Each represents a separate nest series with the exception of numbers 246 and 275, which are from the same nest. All of the collections were made in the period from December 21, 1954, to January 2, 1955.

This species is named for Mr. François Cohic, of the Institut Français d'Océanie, an able and enthusiastic student of New Caledonian entomology.

Ecological notes. All of the collections were made in the rich subtropical evergreen forest clothing the hills that extend from the south bank of the Canala River in the vicinity of the Cin Falls. The holotype colony was found under a rock in a densely shaded part of the forest, and was occupying a single cavity and adjacent short vertical gallery in the soil. The males were very active and attempted to fly when the nest was exposed. Another colony (acc. no. 246-275) was nesting in open soil at the side of one of the forest trails. The nest entrance consisted of a single five-millimeter-wide opening surrounded by a low, indistinct turret of excavated earth. Lateral excavation revealed three or four galleries leading down from the entrance hole and into soil packed between several buried rocks. At about ten centimeters down two small adjacent chambers had been excavated in the soil against the vertical face of one of the rocks. In these were massed all of the brood and most of the workers. The following rough population estimate was made at the time of collection: 80-100 workers, 40 pupae (in cocoons), 30-40 half-grown to fully grown larvae, and 30 eggs. The reproductive of this colony was unfortunately not found.

Workers belonging to colony no. 246-275 and other colonies were encountered on several occasions foraging during the day, always in file, over the surface of the ground, and on one occasion (no. 190) workers were discovered in the upper layers of a moist rotting log. Twice, workers were observed in the act of raiding colonies of the ant genus *Pheidole*. The foraging and raiding behavior of this species will be described in greater detail in a later paper on the general subject of cerapachyine behavior.

PHYRACACES DUMBLETONI Wilson, new species

Diagnosis. Distinguished from all other species of the genus known to me by the following combination of characters: moderately large size (head width of type series 1.16-1.25 mm), antennal scapes unusually long, sides of alitrunk non-marginate, body surface smooth and shining to shagreened and subopaque, body color deep blackish brown to jet black.

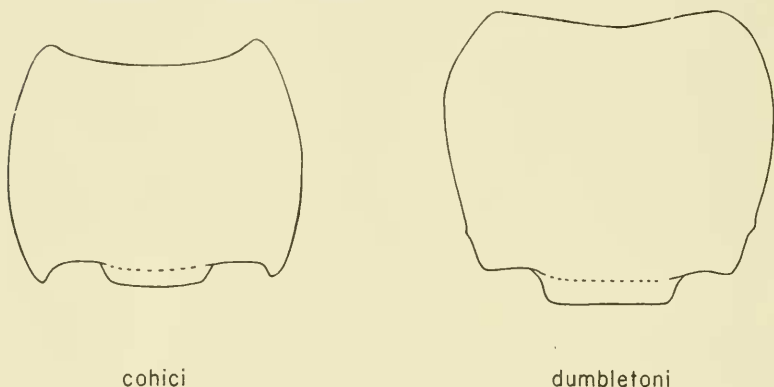
The only other Indo-Australian *Phyracaces* lacking marginalia along the sides of the alitrunk are *aberrans* Clark and *pygmaeus* Clark of northern Queensland and *hewitti* Wheeler of Borneo. These species are easily distinguished from *dumbletoni* by their much shorter scapes, which reach only to about the posterior margins of the compound eyes when the head is viewed in full face—in *dumbletoni* the scapes extend beyond the eyes by about their own maximum width. Of the three species, *dumbletoni* most resembles *aberrans* Clark, being very close in both size and sculpturing.

Holotype worker. Head width 1.17 mm, head length 1.30 mm, scape length 1.08 mm, cephalic index 90, scape index 92, exposed length of mandibles 0.29 mm, eye length 0.33 mm, pronotal width 1.03 mm, petiole width 0.95 mm, petiole length 0.76 mm, postpetiole width 1.09 mm, width of next gastric segment 1.26 mm. Occipital border in full-face view very feebly convex. Alitrunk viewed from above only feebly constricted medially, its dorso-lateral area evenly rounded and lacking any trace of marginalia. Petiolar node seen from directly above with moderately concave anterior border and evenly convex lateral borders, its greatest width located in the anterior half.

Puncturation as described for *P. cohici*, except that anterior to the postpetiole the punctures are more scattered, the majority being 0.09 to 0.12 mm apart. On the postpetiole and anterior to this segment the interspaces are for the most part "shagreened," the shagreening in this case in reality consisting of regular, minute, contiguous foveolae each about 0.01 mm in diameter. The foveolae are deepest on the dorsal surface of the head and alitrunk, and render most of the cuticular surface there subopaque. They are absent posterior to the postpetiole.

Color as described for *P. cohici*.

Worker variation. Maximum head width range, Chapeau Gendarme and Mt. Mou series: 1.16-1.25 mm (all shown by acc. no. 65, the holotype nest series). Maximum head width range, Ciu series: 1.11-1.20 mm (all shown by acc. no. 245). The Ciu workers differ significantly from the Chapeau Gendarme and Mt. Mou workers in the intensity of the foveolar "shagreening." The latter approach the condition described in the holotype, with little deviation. The Ciu specimens have the same basic form of sculpturing, but on the head and alitruncal dorsum the foveolae are much shallower, so that the surface is strongly shining under ordinary reflected light.



Dorsal view of the petioles of the two New Caledonian species of *Phyracaces*; outlines drawn to scale from the holotypes.

Ergatogyne. Head width 1.14 mm, head length 1.26 mm, scape length 0.76 mm, cephalic index 90, scape index 67, exposed length of mandibles 0.22 mm, eye length 0.30 mm, pronotal width 1.00 mm, petiole width 0.95 mm, petiole length 0.62 mm, postpetiole width 1.32 mm, width of next gastric segment 1.55 mm. Ocelli lacking. More similar to the worker caste than to the queen caste of other *Phyracaces* species, differing primarily in the following external features. (1) The alitrunk is very worker-like, apparently differing only in the somewhat stronger pleural saturation. The posterior metapleural suture, which is absent in the *dumbletoni* worker, is present although feebly developed in the ergatogyne. (2) The petiole is relatively shorter

in the ergatogyne. (3) The postpetiole and gaster are much more massive and more poorly demarcated from each other than are the same structures in the worker.

Types. Described from a long series of workers from Chapeau Gendarme (Yahoué), Mt. Mou, and Ciu, and a single ergatogyne from Ciu. The following accessions are included, each representing a separate nest series: Chapeau Gendarme, no. 65 (holotype nest series); Mt. Mou, single worker; Ciu, no. 245 and "observation colony."

This species is named after Mr. L. J. Dumbleton, formerly economic entomologist for the South Pacific Commission, and an expert student of the New Caledonian insect fauna.

Ecological notes. *P. dumbletoni* was collected at Chapeau Gendarme and Mt. Mou in dry, semi-deciduous "valley-pocket" forest and at Ciu in moist broadleaf evergreen forest. In all three localities it was limited primarily to the least disturbed portions of the forest, and was never encountered in the adjacent open *Melaleuca* woodland.

At Chapeau Gendarme a large colony (no. 65) was found nesting in several spacious galleries and chambers in the upper layers of a large, moist, fern-covered log. It contained at least 200 workers, a single ergatogyne (later lost), over 100 cocoons and larger larvae, and an undetermined number of eggs. Among the brood were found the hollowed-out propodeum of a worker of an undescribed species of *Lordomyrma* and the mangled remains of the larva of an undetermined ant genus. These insects appeared to be the prey of the *Phyracaces*, but of course this cannot be proven.

When first disturbed, many of the *Phyracaces* workers sallied out with a display of aggressiveness unusual for cerapachyines, and one succeeded in stinging me on the forearm. I think it is worth mentioning that this is the only time I have ever been stung by a cerapachyine ant, despite the fact that I have excavated many nests of *Phyracaces* and other genera without making any effort to protect myself from the workers. The sting caused a prominent welt about six millimeters wide surrounded by an erythema about twenty-five millimeters wide. There was a persistent, dull, throbbing pain of the sort commonly resulting from the stings of ponerine ants.

SPHINCTOMYRMEX CALEDONICUS Wilson, new species

Diagnosis. Closely resembling *S. steinheili* Forel of eastern Australia, from which it can be distinguished by the following two characters. (1) Sculpturing, which is dominated by puncturation, is overall denser in *caledonicus*. In *steinheili*, the interspace distances over the genal surface are mainly as great as the adjacent puncture diameters or greater, while in *caledonicus* the genal punctures are contiguous and their borders form an even rugoreticulum. In *steinheili*, the lateral surfaces of the alitrunk are in large part feebly shining, while in *caledonicus* these surfaces are entirely opaque. (2) In side view, the dorsal posterior corners of the propodeum form a distinct angle of about 110° in *steinheili*, but are evenly rounded in *caledonicus*.

Holotype worker. Head width 0.56 mm, head length 0.71 mm, scape length 0.41 mm, cephalic index 79, scape index 73, exposed length of mandibles 0.06 mm, pronotal width 0.42 mm, petiole width 0.35 mm, petiole length (including peduncles) 0.38 mm, postpetiole width 0.47 mm, width of next gastric segment 0.60 mm, length of gaster posterior to postpetiole (measured in a straight line) 1.35 mm.

Worker variation. Maximum head width range (internidal) 0.50-0.57 mm; (intranidal; acc. no. 195) 0.50-0.56 mm. In size as well as other external characters the worker type series is remarkably uniform.

Ergatogyne. Head width 0.62 mm, head length 0.76 mm, scape length 0.42 mm, cephalic index 82, scape index 68, exposed length of mandibles 0.09 mm, pronotal width 0.44 mm, petiole width 0.42 mm, petiole length 0.41 mm, postpetiole width 0.60 mm, length of gaster posterior to postpetiole 1.96 mm. This specimen is very worker-like, and can be distinguished only by its slightly larger size, proportionately shorter head and scapes, broader petiole, and larger postpetiole and gaster. In addition the postpetiolar-gastric constriction is somewhat weaker than in the worker. Compound eyes and ocelli are completely lacking, as in the worker, and the structure of the alitrunk is essentially the same.

Types. Described from a long series of workers and a single ergatogyne from Ciu, 300 meters, New Caledonia. The following two accessions, representing separate nest series, are included:

no. 195, no. 225. The holotype was chosen from no. 225.

Ecological notes. The two type colonies were found in a small, isolated patch of broadleaf evergreen forest on the farm of Mr. D. Fèré, about half a kilometer northwest of the Ciu Falls. This little woodlot did not exceed two acres in extent, and its floor had been badly disturbed by cattle. Most of the ants present, including the *Sphinctomyrmex*, were found underneath rocks embedded in the soil. It is curious that the *Sphinctomyrmex* was not found in the undisturbed forest on the south bank of the Canala River a short distance away, despite intensive collecting there.

Both colonies were quite large, one containing over 500 workers and the other over a thousand. That the colonies may have been in migration is suggested by the fact that they occupied poorly defined galleries in the soil which bore no sign of lengthy occupation. The brood of colony no. 195, collected on December 21, consisted of large numbers of mature larvae; two days later, about three-quarters of a sample of these larvae kept alive in a bottle had spun cocoons. The brood of colony no. 229, collected on December 31, consisted of large numbers of cocoons, all of which contained prepupae of indeterminate caste. These data suggest a high degree of synchronization of brood development, a condition usually associated in ants with a nomadic way of life. An account of the behavior of the workers of this species will be given in a later paper.